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Case Docket No. PHD 99,182

THE COMMISSIONER FOR PATENTS, Washington, D.C. 20231

jc525 U.S. PTO 09/660917 09/13/00

Enclosed for filing is the patent application of Inventor:
MATTHIAS WENDT, WOLFGANG BUDDE and PETER FUHRMANN

FOR: NETWORK COUPLER

ENCLOSED ARE:

[X] Appointment of Associates;
[ ] Information Disclosure Statement, Form PTO-1449 and copies of documents listed therein;
[X] Preliminary Amendment;
[X] Specification (10 Pages of Specification, Claims, & Abstract);
[X] Declaration and Power of Attorney:
(2 Pages of a [ ]fully executed [X]unsigned Declaration);
[X] Drawing (2 sheets of [ ]informal [X]formal sheet);
[ ] Certified copy of Application Serial # ;
[X] Authorization Pursuant to 37 CFR §1.136(a)(3)
[ ] Other: ;
[ ] Assignment to .

FEE COMPUTATION

CLAIMS AS FILED				
FOR	NUMBER FILED	NUMBER EXTRA	RATE	BASIC FEE - $690.00
Total Claims	10 - 20 =		X $18 =	0.00
Independent Claims	1 - 3 =		X $78 =	0.00
Multiple Dependent Claims, if any			$260 =	0.00
TOTAL FILING FEE			=	$ 690.00

Please charge Deposit Account No. 14-1270 in the amount of the total filing fee indicated above, plus any deficiencies. The Commissioner is also hereby authorized to charge any other fees which may be required, except the issue fee, or credit any overpayment to Account No. 14-1270.

[ ]Amend the specification by inserting before the first line as a centered heading --Cross Reference to Related Applications--; and insert below that as a new paragraph --This is a continuation-in-part of application Serial No. , filed , which is herein incorporated by reference--.

CERTIFICATE OF EXPRESS MAILING

Express Mail Mailing Label No. EL 458 219 467 US
Date of Deposit: September 13, 2000
I hereby certify that this paper and/or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 C.F.R. 1.10 on the date indicated above and is addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231.

Patti DeMichele
Typed Name **Signature**

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of | Atty. Docket

MATTHIAS WENDT ET AL | PHD 99,182

Serial No.

Filed: CONCURRENTLY

NETWORK COUPLER

Honorable Commissioner of Patents and Trademarks
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Sir:

Prior to calculation of the filing fee and examination, please amend the above-identified application as follows:

IN THE TITLE

Please change the Title to all Capital Letters.

IN THE SPECIFICATION

Page 1, before line 1, insert as a centered heading:

--BACKGROUND OF THE INVENTION--;

between lines 8 and 9, insert as a centered heading:

--SUMMARY OF THE INVENTION--;

Page 3, between lines 4 and 5, insert as a centered heading:

--BRIEF DESCRIPTION OF THE DRAWING--;

between lines 14 and 15, insert as a centered heading:

--DESCRIPTION OF THE PREFERRED EMBODIMENTS--;

IN THE CLAIMS

Page 8, before line 1, replace "CLAIMS:" with

--WHAT IS CLAIMED IS:--

Claim 9, line 1, change "any one of claims 1 to 8" to

--claim 1--.

IN THE ABSTRACT

Before line 1, delete "ABSTRACT:" and substitute the following as a centered heading:

--ABSTRACT OF THE DISCLOSURE--;

line 10, delete "Fig.1".

REMARKS

The Abstract and Specification have been amended to add headings in accordance with MPEP Section 601. The claims have been amended in order to reformat the claims to delete all multiple dependencies prior to calculation of the filing fee and place the instant application in standard U.S. format.

Entry of this amendment prior to calculating the filing fee is respectfully requested.

Respectfully submitted,

By _____
Steven R. Biren, Reg. 26,531
Attorney
(914) 333-9630
September 13, 2000

Network coupler

The invention relates to a network coupler for network users in a network comprising at least two lines.

Network couplers are generally used for coupling in and coupling out data transferred via a network. They thus establish the connection between a network user and the network. Data supplied by a network user are coupled into the network by means of the network coupler. Conversely, data transferred through the network are coupled out by means of the network coupler and made available to the network user.

Known network couplers are limited to coupling in and coupling out data.

It is an object of the invention to provide a network coupler which is not only suitable for data transfer but also for energy transfer.

According to the invention, this object is achieved in that the network coupler is formed in such a way that it is suitable for data transfer via the two lines of the network and for coupling out energy from the two lines of the network to which a terminal of a voltage source is coupled, in that the network coupler symmetrically couples energy into and/or out of the two lines, in that the network coupler couples the data symmetrically, differentially and inductively or capacitively into and/or out of the two lines, and in that the network coupler symmetrically terminates the two lines.

For the purpose of data transfer, the data are transferred symmetrically and differentially on the two lines of the network. For example, a data bit transferred through the network lines is, however, transferred with opposite polarities through the two lines. The network coupler couples in or couples out these data inductively or capacitively, as well as symmetrically and differentially.

Moreover, the network coupler is also suitable for energy transfer. A terminal of a voltage source is coupled to the two lines of the network. The network coupler is formed in such a way that it can couple out this energy from the two lines. This is effected symmetrically, i.e. the current drawn by the network coupler from the lines of the network is equally large in the two lines. This is achieved in that the load represented by the network coupler with respect to the two lines of the network is equally large on the two lines, so that the two lines are symmetrically terminated.

It is thereby achieved, on the one hand, that both data and energy transfer is made possible via the network coupler, or via the two lines of the network. Due to the strictly symmetrical coupling-out of supply currents on the two lines and the symmetrical differential transfer of data on the two lines, it is achieved that the data transfer is not disturbed by disturbances on the two network lines, which disturbances may have been caused, for example, by the energy distribution.

Such network couplers can be constructed in a relatively simple and, hence, low-cost way.

An embodiment of the network coupler according to the invention, as defined in claim 2, is characterized by such a simple structure but can nevertheless fulfill the above-mentioned conditions. The two first and second primary coils which have the same resistance or impedance are used, on the one hand, for coupling out energy from the two lines of the network. This is effected symmetrically, i.e. currents which flow in response to the coupling-out of energy are divided into equal currents on the two lines.

The first primary coil and the second primary coil are magnetically coupled to a secondary coil. In the secondary coil, a voltage is only induced when a differential current flows between the two first terminals of the first and the second primary coil. On the other hand, currents of the same sign in the two windings do not lead to a voltage induction in the secondary coil. It is thereby achieved that data differentially transferred through the two lines lead to a voltage induction in the secondary coil but are not accompanied by disturbances taking place at the same sign, which disturbances may occur, for example, due to fluctuations of the power supply voltage as a result of a varying load.

To achieve the symmetrical coupling-out as described above, the two primary coils are advantageously formed as defined in claim 3. In the simplest case, this can be achieved by manufacturing the windings of the same material and giving them the same cross-section and the same number of turns, as defined in claim 4.

The ratio of turns between the number of turns of the primary coils and the number of turns of the secondary coil defines the voltage ratio of the differential voltage at the terminals of the secondary coil. It has been proved to be advantageous, as in a further embodiment of the invention, defined in claim 5, that the secondary coil has a higher number of turns than the primary coils.

The primary coils may be constructed in a relatively simple manner in that they are formed, for example, in further embodiments of the invention, as metal strips and may have a number of turns of $n = 1$.

A further advantageous construction of the coils is that they are provided as a printed circuit on a plate, as defined in claim 8.

These and other aspects of the invention are apparent from and will be elucidated with reference to the embodiments described hereinafter.

In the drawings:

Fig. 1 is a circuit diagram of a network coupler according to the invention.

Fig. 2 shows diagrammatically the construction of a network coupler with two primary coils and one secondary coil which are magnetically coupled together,

Fig. 3 is a schematic drawing of a network coupler as shown in Fig. 2, in which the number of turns of the primary coils was chosen to be 1,

Fig. 4 shows a first realization of a network coupler with coils as shown in Fig. 3, and

Fig. 5 shows a second realization of a network coupler with coils as shown in Fig. 3.

Fig. 1 is a circuit diagram of a network coupler according to the invention.

The network coupler couples data into and out of lines 1 and 2, respectively, of a network, as well as a power supply terminal which is coupled to both lines 1 and 2. To this end, the network coupler should make available a power supply voltage +Ub at a power supply point 3, which power supply voltage is coupled out of the two lines 1 and 2 of the network.

To this end, two primary coils 4 and 5 are provided which, in the ideal case, have the same construction, i.e. consist of the same material and have the same cross-section as well as the same number of turns. In any case, the two primary coils 4 and 5 must have the same resistance and impedance.

The first terminals of the two primary coils 4 and 5 are coupled to one of the lines 1 and 2, respectively, of the network. The second terminals are connected to the common power supply point 3.

Due to this special construction of the network coupler, it is achieved that power supply currents flowing at the power supply point 3 are divided into two equally large currents which flow in the primary coils 4 and 5 and hence in the two lines 1 and 2 of the network. Thus, a strictly symmetrical load of the two lines 1 and 2 with power supply currents is achieved.

Data, which are transferred symmetrically and differentially on the two lines may also be transferred through the two lines 1 and 2 of the network.

To couple out these data, the network coupler shown in Fig. 1 comprises a secondary coil 6 which is magnetically coupled to the two primary coils 4 and 5 by means of a magnetic coupling 7.

A voltage is only induced in the winding of the secondary coil 6 when differential currents occur in the primary coils 4 and 5. This is exactly the case when data are symmetrically and differentially transferred on the two lines 1 and 2 of the network. Then, there is a corresponding induction of the voltage in the secondary coil 6.

Conversely, the same applies to coupling in data which can be coupled in a differential form into the two lines 1 and 2 of the network by means of the primary coil 2 and the coupling 7 and the two primary coils 4 and 5.

To couple out the data, a first terminal of the secondary coil 6, which conveys the data with negative polarity, is connected to an inverting input of an amplifier 8. The second terminal of the secondary coil 6 is coupled to a second non-inverting input of the same amplifier. The data can thus be evaluated by means of such an amplifier 8. At the output, the amplifier 8 provides the corresponding data at a terminal 11 which is denoted in the Figure by D_out.

To couple data into the two lines 1 and 2 of the network by means of the network coupler, an amplifier 9 is provided, whose non-inverting input is coupled to the second terminal of the secondary coil 6 and whose inverting output is coupled to the first terminal of the secondary coil 6. The data applied to the input of the amplifier from a second connection point 10 are thus made available as signals +D and –D of different polarities by means of the amplifier 9 and transferred via the primary coil 2 and the magnetic coupling 7 to the primary coils 4 and 5, so that corresponding symmetrical differential voltage signals are coupled into the lines 1 and 2 of the network.

In spite of the relatively simple construction of the network coupler shown in Fig. 1, it allows both a transfer of data and a supply of energy. Due to the strictly symmetrical coupling-out of currents of the energy supply, the data are not disturbed. Conversely, the data are transferred differentially so that the power supply voltage is not disturbed.

The network coupler thus fulfills all requirements which are to be imposed for a simultaneous undisturbed data transfer and energy transfer via two lines of a network.

Fig. 2 shows diagrammatically how the two primary coils 4 and 5, the secondary coil 6 and the magnetic coupling 7 shown in Fig. 1 can be realized in practice.

To this end, Fig. 2 shows a core 12 which is capable of conveying a magnetic flux.

Two primary coils 13 and 14 are provided which, in the embodiment shown in the Figure, have three windings each. A secondary coil 15 is wound around the same core 12, which coil has also three windings in this embodiment.

The two terminals of the secondary coil 15 supply the positive and negative data signals +D and –D, respectively. The first terminals of the two primary coils 13 and 14 are connected to the two lines 1 and 2 of the network and their second terminals are jointly connected to the power supply point 3.

Fig. 2 shows that the arrangement of the windings with their magnetic coupling as shown in Fig. 1 can be very easily realized by means of three windings around a common magnetizable core.

In Fig. 2, the two primary coils 13 and 14 have a number of turns of n1, whereas the secondary coil has a number of turns of n2. The ratio of turns between 2.n1 and n2 determines the voltage ratio at the two terminals 16 and 17 of the secondary coil 15, at which the positive data signal +D and the negative data signal –D are made available.

To achieve a sufficiently high voltage at this point, it has been proved to be advantageous to choose n2 to be larger than n1.

Since, moreover, half the power supply current flows through the windings n1 of the two primary coils 4 and 5, it is advantageous to give them a relatively large cross-section.

Fig. 3 shows diagrammatically, and similarly as in Fig. 2, which of the two primary coils 13 and 14 have only one turn n1 = 1. However, the secondary coil 15 has a number of turns of n2 = 5.

It is achieved by this ratio of the number of turns that the differential voltage at the terminals 16 and 17 of the secondary coil 15 is relatively large.

Fig. 4 shows a first concrete embodiment of a network coupler in which the ratio of the number of turns is chosen to be the ratio as shown diagrammatically in Fig. 3.

Two metal strips 21 and 22 are provided, which have a relatively large cross-section and are connected to a common power supply point 23. As is shown in Fig. 4A, the two metal strips 21 and 22 run cross-wise through a magnetic core 24 and thus each constitute a coil with one turn.

As is shown in Fig. 4B, a secondary coil 25 is wound around this magnetic core 24.

The embodiment shown in Fig. 4 has the advantage that a relatively high differential voltage is induced in the secondary coil 25 because of the ratio of the number of turns n2:n1 of the secondary coil 25 and the primary coils 21 and 22.

The relatively large power supply currents flowing in the primary coils 21 and 22, which currents are jointly fed to the power supply point 23, are passed through the metal strips 21 and 22 which can take up these currents without any problem.

Such an arrangement as shown in Fig. 4 may be advantageously accommodated or molded in a housing and, for example, enveloped with a synthetic material. Only the connection points 1, 2, 23 and the two terminals of the secondary coil 25 must then be led to the exterior.

The terminals may be pressed on or realized as plug connections. Particularly on the network side, a possibly low contact resistance is to be taken into account in this case in order that fluctuations of the power supply currents do not disturb the data transfer.

To integrate such a network coupler in an electronic apparatus, it may be advantageous to choose the second embodiment as shown in Fig. 5. In this embodiment, a two-layer plate 31 is provided, having one of the primary windings 32 and 33 on both of its sides, which windings are each wound once around the magnetic core 34 and thus have a number of turns of $n1 = 1$ each. A secondary coil 35 is also provided on both sides of the plate, which coil is wound a number of times around the magnetic core 34 via which a magnetic coupling between the two primary coils 32 and 33, on the one hand, and the secondary coil 35, on the other hand, is achieved.

In such an arrangement, the three coils can thus be jointly formed on a two-layer plate which may further simplify the construction of the network coupler.

Also in this case, it is essential that the wiring is strictly symmetrical and that particularly the two primary coils 32 and 33 ensure a symmetrical current division of the current flowing through the power supply point 36. The power supply point 36 is therefore arranged symmetrically and realized by means of a through-contact.

A plate having more than two layers may be provided, in which the power supply point 36 is advantageously provided on another layer than the primary windings 32 and 33.

The magnetic core 34 may advantageously consist of two parts which are placed from both sides on the plate 31. Other cores may of course also be used, as is shown in Fig. 5.

The Figure shows that a relatively simple realization of the network coupler according to the invention is possible, allowing both a data transfer and an energy transfer through two lines of a network without any mutual disturbance.

CLAIMS:

1. A network coupler for network users in a network comprising at least two lines (1, 2), characterized in that the network coupler is formed in such a way that it is suitable for data transfer via the two lines (1, 2) of the network and for coupling out energy from the two lines (1, 2) of the network to which a terminal of a voltage source is coupled, in that the network coupler symmetrically couples energy into and/or out of the two lines (1,2), in that the network coupler couples the data symmetrically, differentially and inductively or capacitively into and/or out of the two lines (1, 2), and in that the network coupler symmetrically terminates the two lines (1, 2).

2. A network coupler as claimed in claim 1, characterized in that the network coupler comprises a first primary coil (4; 13; 21; 32) having a first terminal which is coupled to the first line (1) of the network, and a second primary coil (5; 14; 22; 33) having a first terminal which is coupled to the second line (2) of the network, in that the two second terminals of the first primary coil (4; 13; 21; 32) and the second primary coil (5; 14; 22; 33) are interconnected at a power supply point (3; 23; 36) which supplies a power supply voltage, in that the network coupler comprises a secondary coil (5; 15; 25; 34, 35) by means of which data can be coupled into or out of the two lines (1, 2) of the network, and in that the two primary coils (4; 13; 21; 32), (5; 14; 22; 33) and the secondary coil (5; 15; 25; 34, 35) of a core (7; 12; 24; 34) are magnetically coupled together.

3. A network coupler as claimed in claim 2, characterized in that the two primary coils (4; 13; 21; 32), (5; 14; 22; 33) are formed in such a way that a current flowing through the power supply point (3; 23; 36) is divided into two equally large currents flowing in the two lines (1, 2) of the network.

4. A network coupler as claimed in claim 3, characterized in that the two primary coils (4; 13; 21; 32), (5; 14; 22; 33) consist of the same material and have the same cross-section, length and number of turns.

5. A network coupler as claimed in claim 1, characterized in that the secondary coil (5; 15; 25; 34, 35) has a higher number of turns than the primary coil (4; 13; 21; 32), (5; 14; 22; 33).

6. A network coupler as claimed in claim 1, characterized in that the primary coils (4; 13; 21; 32), (5; 14; 22; 33) have a number of turns of n = 1.

7. A network coupler as claimed in claim 1, characterized in that the primary coils are formed as metal strips (21, 22) which are preferably led cross-wise through the core (24).

8. A network coupler as claimed in claim 1, characterized in that a printed circuit having a two-layer plate (31) is provided on which both the two primary coils (32, 33) and the secondary coils (34, 35) are printed as conductor tracks.

9. A network user with a network coupler as claimed in any one of claims 1 to 8, characterized in that the data transferred or received by the network user in the network are coupled into or out of the two lines (1, 2) of the network by means of the network coupler, and in that the energy supply of the network user is ensured by means of the energy which is coupled out of the two lines (1, 2) of the network by the network coupler and is made available at the power supply point (3; 23; 36).

10. A network user as claimed in claim 9, characterized in that the network user is a sensor, an actuator or a control device of a vehicle.

ABSTRACT:

For a network coupler for network users in a network comprising at least two lines, a simultaneous data and energy transfer is ensured in that the network coupler is formed in such a way that it is suitable for data transfer via the two lines (1, 2) of the network and for coupling out energy from the two lines (1, 2) of the network to which a terminal of a voltage source is coupled, in that the network coupler symmetrically couples energy into and/or out of the two lines (1,2), in that the network coupler couples the data symmetrically, differentially and inductively or capacitively into and/or out of the two lines (1, 2), and in that the network coupler symmetrically terminates the two lines (1, 2).

Fig. 1

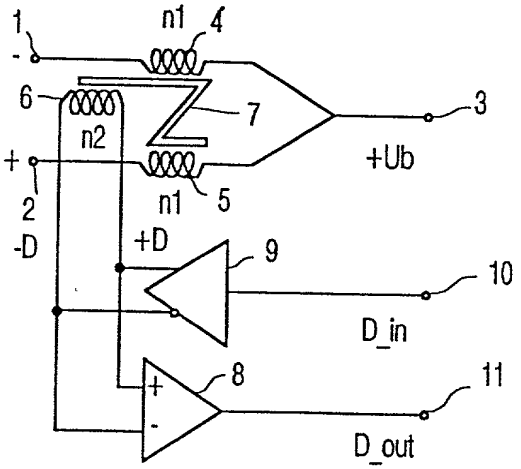

FIG. 1

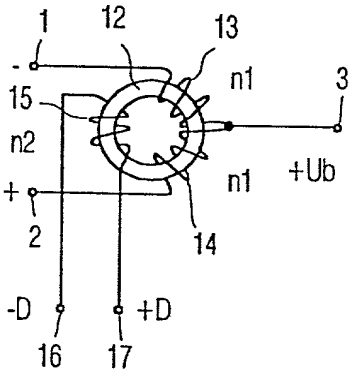

FIG. 2

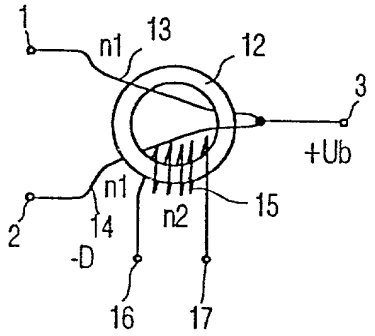

FIG. 3

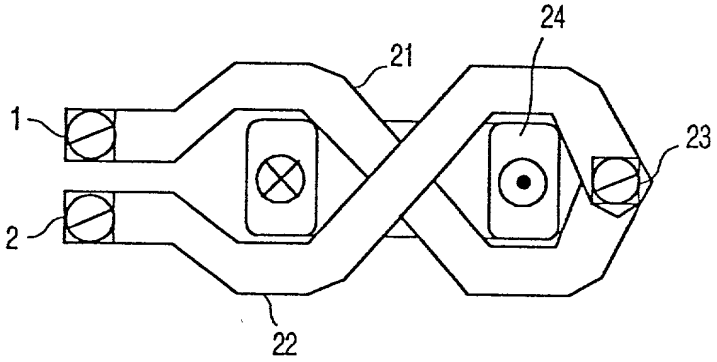

FIG. 4A

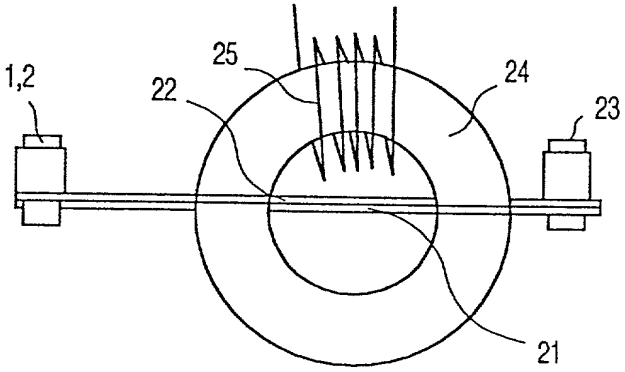

FIG. 4B

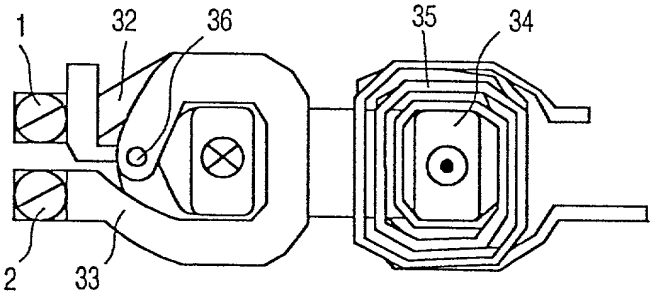

FIG. 5A

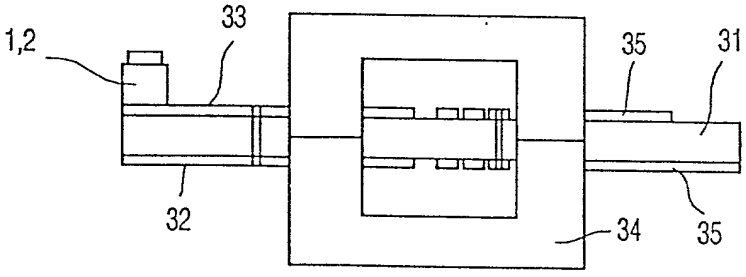

FIG. 5B

DECLARATION and POWER OF ATTORNEY

ATTORNEY'S DOCKET NO.:
PHD 99.182 US

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled **"Network coupler"**

the specification of which (check one)

☐ is attached hereto.

☐ was filed on _____ as Application Serial No. _____ and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by the amendment(s) referred to above.

I acknowledge the duty to disclose information which is material to patentability of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

PRIOR FOREIGN APPLICATION(S)

COUNTRY	APP. NUMBER	DATE OF FILING (DATE, MONTH, YEAR)	PRIORITY CLAIMED UNDER 35 U.S.C. 119
Germany	**19943895.1**	**14 September 1999**	**YES**
Germany	**19960470.3**	**14 December 1999**	**YES**

☐ I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35 United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1,56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

PRIOR UNITED STATES APPLICATION(S)

APPLICATION SERIAL NUMBER	FILING DATE	STATUS (PATENTED, PENDING, ABANDONED)

☐ I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (list name and registration number)

Jack E. Haken, Reg. No. 26,902
Michael E. Marion, Reg. No. 32,266
Edward M. Blocker, Reg. No. 30,245

SEND CORRESPONDENCE TO: Corporate Patent Counsel; U.S. Philips Corporation; 580 white Plains Road; Tarrytown, NY 10591	DIRECT TELEPHONE CALLS TO: (name and telephone No.) (914) 332-0222

Dated:		Inventor's Signature:		
Full Name of in Inventor	Last Name **WENDT**	First Name **Matthias**	Middle Name	
Residence & Citizenship	City **Würselen**	State of Foreign Country **Germany**	Country of Citizenship **Germany**	
Post Office Address	Street **Pfarrer-Thome-Strasse 9**	City **D-52146 Würselen**	State of Country **Germany**	Zip Code
Dated:		Inventor's Signature:		
Full Name of in Inventor	Last Name **BUDDE**	First Name **Wolfgang**	Middle Name	
Residence & Citizenship	City **Aachen**	State of Foreign Country **Germany**	Country of Citizenship **Germany**	
Post Office Address	Street **Kandelfeldstrasse 41**	City **D-52074 Aachen**	State of Country **Germany**	Zip Code

Dated:		Inventor's Signature:		
Full Name of in Inventor	Last Name **FUHRMANN**	First Name **Peter**	Middle Name	
Residence & Citizenship	City **Aachen**	State of Foreign Country **Germany**	Country of Citizenship	
Post Office Address	Street **Auf der Hüls 20**	City **52080 Aachen**	State of Country **Germany**	Zip Code
Dated:		Inventor's Signature:		
Full Name of in Inventor	Last Name	First Name	Middle Name	
Residence & Citizenship	City	State of Foreign Country	Country of Citizenship	
Post Office Address	Street	City	State of Country	Zip Code
Dated:		Inventor's Signature:		
Full Name of in Inventor	Last Name	First Name	Middle Name	
Residence & Citizenship	City	State of Foreign Country	Country of Citizenship	
Post Office Address	Street	City	State of Country	Zip Code
Dated:		Inventor's Signature:		
Full Name of in Inventor	Last Name	First Name	Middle Name	
Residence & Citizenship	City	State of Foreign Country	Country of Citizenship	
Post Office Address	Street	City	State of Country	Zip Code
Dated:		Inventor's Signature:		
Full Name of in Inventor	Last Name	First Name	Middle Name	
Residence & Citizenship	City	State of Foreign Country	Country of Citizenship	
Post Office Address	Street	City	State of Country	Zip Code

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

MATTHIAS WENDT ET AL

Serial No.

Filed: CONCURRENTLY

NETWORK COUPLER

Atty. Docket

PHD 99,182

Commissioner for Patents
Washington, D.C. 20231

APPOINTMENT OF ASSOCIATES

Sir:

The undersigned Attorney of Record hereby revokes all prior appointments (if any) of Associate Attorney(s) or Agent(s) in the above-captioned case and appoints:
Steven R. Biren (Registration No. 26,531)
c/o U.S. PHILIPS CORPORATION, Intellectual Property Department, 580 White Plains Road, Tarrytown, New York 10591, his Associate Attorney(s)/Agent(s) with all the usual powers to prosecute the above-identified application and any division or continuation thereof, to make alterations and amendments therein, and to transact all business in the Patent and Trademark Office connected therewith.

ALL CORRESPONDENCE CONCERNING THIS APPLICATION AND THE LETTERS PATENT WHEN GRANTED SHOULD BE ADDRESSED TO THE UNDERSIGNED ATTORNEY OF RECORD.

Respectfully,

Jack E. Haken, Reg. 26,902
Attorney of Record

Dated at Tarrytown, New York
this 13TH day of SEPTEMBER 2000.

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